

WE CLAIM:

1. A polymer that is the product of polymerization of a monomer mixture comprising: at least one amino-substituted vinyl monomer; at least one hydrophobic nonionic vinyl monomer; at least one associative vinyl monomer; and at least one semihydrophobic vinyl surfactant monomer.

5 2. The polymer of claim 1 wherein the amino-substituted vinyl monomer is selected from:

10 a mono-(C₁-C₄)alkylamino(C₁-C₈)alkyl (meth)acrylate,
a di-(C₁-C₄)alkylamino(C₁-C₈)alkyl (meth)acrylate,
a mono-(C₁-C₄)alkylamino(C₁-C₈)alkyl (meth)acrylamide,
a di-(C₁-C₄)alkylamino(C₁-C₈)alkyl (meth)acrylamide,
a nitrogen-containing heterocyclic (meth)acrylamide,
a nitrogen-containing heterocyclic (meth)acrylate, and a mixture
thereof.

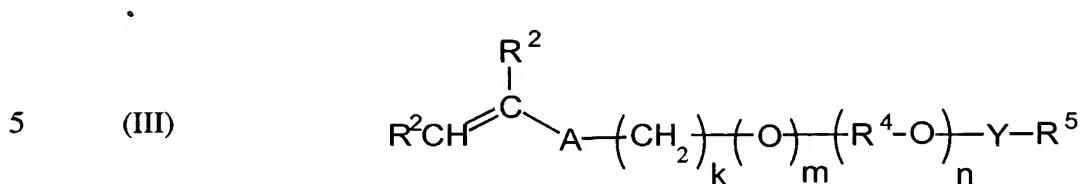
15 3. The polymer of claim 1 wherein the hydrophobic nonionic vinyl monomer is a compound having either of the following formulas (I) or (II):

(I) CH₂=C(X)Z,
(II) CH₂=CH-OC(O)R;

20 wherein, in each of formulas (I) and (II), X is H or methyl; and Z is -C(O)OR¹, -C(O)NH₂, -C(O)NHR¹, -C(O)N(R¹)₂, -C₆H₄R¹, -C₆H₄OR¹, -C₆H₄C1, -CN, -NHC(O)CH₃, -NHC(O)H, N-(2-pyrrolidonyl), N-caprolactamyl, -C(O)NHC(CH₃)₃, -C(O)NHCH₂CH₂-N-ethyleneurea, -SiR₃, -C(O)O(CH₂)_xSiR₃, -C(O)NH(CH₂)_xSiR₃, or -(CH₂)_xSiR₃; x is an integer in the range of 1 to about 6; each R is independently C₁-C₃₀ alkyl; each R¹ is independently C₁-C₃₀ alkyl, hydroxy-substituted C₂-C₃₀ alkyl or halogen-substituted C₁-C₃₀ alkyl.

25 4. The polymer of claim 1 wherein the hydrophobic nonionic vinyl monomer is a C₁-C₃₀ alkyl ester of acrylic acid, a C₁-C₃₀ alkyl ester of methacrylic acid, or a mixture thereof.

5. The polymer of claim 1 wherein the associative vinyl monomer is selected from at least one compound of the following formula (III):



wherein,

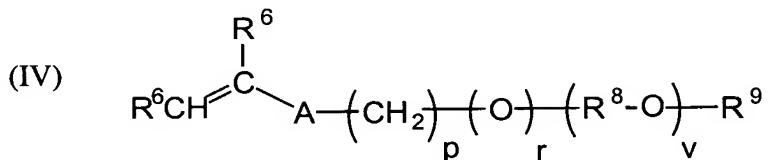
each R^2 is independently H, methyl, $-C(O)OH$, or $-C(O)OR^3$; R^3 is C_1-C_{30} alkyl; 10 A is $-CH_2C(O)O-$, $-C(O)O-$, $-O-$, $-CH_2O-$, $-NHC(O)NH-$, $-C(O)NH-$, $-Ar-(CE_2)_z-NHC(O)O-$, $-Ar-(CE_2)_z-NHC(O)NH-$, or $-CH_2CH_2NHC(O)-$; Ar is a divalent aryl; E is H or methyl; z is 0 or 1; k is an integer in the range of 0 to about 30, and m is 0 or 1, with the proviso that when k is 0, m is 0, and when k is in the range of 1 to about 30, m is 1; $(R^4-O)_n$ is a polyoxyalkylene, which is a homopolymer, a random copolymer, or a block copolymer of C_2-C_4 oxyalkylene units, wherein R^4 is C_2H_4 , C_3H_6 , C_4H_8 , or a mixture thereof, and n is an integer in the range of about 5 to about 250; Y is $-R^4O-$, $-R^4NH-$, $-C(O)-$, $-C(O)NH-$, $-R^4NHC(O)NH-$, or $-C(O)NHC(O)-$; and R^5 is a substituted or unsubstituted 15 alkyl selected from the group consisting of a C_8-C_{40} linear alkyl, a C_8-C_{40} branched alkyl, a C_8-C_{40} carbocyclic alkyl, a C_2-C_{40} alkyl-substituted phenyl, an aryl-substituted C_2-C_{40} alkyl, and a C_8-C_{80} complex ester; wherein the R^5 alkyl group optionally comprises one or more substituents selected from the group consisting of a hydroxyl group, an alkoxy group, and a halogen group.

20 25 6. The polymer of claim 1 wherein the semi-hydrophobic vinyl surfactant monomer comprises a polymerizable, unsaturated end group and a polyoxyalkylene group covalently bonded thereto.

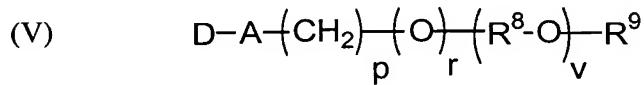
7. The polymer of claim 6 wherein the polyoxyalkylene group is a homopolymer, a random copolymer, or a block copolymer comprising about 5 to about 250 $C_2 - C_4$ oxyalkylene units.

8. The polymer of claim 1 wherein the semihydrophobic vinyl surfactant monomer is a compound having either of the following formulas (IV) or (V):

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wherein, in each of formulas (IV) and (V),

each R^6 is independently H, C_1-C_{30} alkyl, $-C(O)OH$, or $-C(O)OR^7$; R^7 is C_1-C_{30} alkyl; A is $-CH_2C(O)O-$, $-C(O)O-$, $-O-$, $-CH_2O-$, $-NHC(O)NH-$, $-C(O)NH-$,

15 $-Ar-(CE_2)_z-NHC(O)O-$, $-Ar-(CE_2)_z-NHC(O)NH-$, or $-CH_2CH_2NHC(O)-$; Ar is a divalent aryl; E is H or methyl; z is 0 or 1; p is an integer in the range of 0 to about 30, and r is 0 or 1, with the proviso that when p is 0, r is 0, and when p is in the range of 1 to about 30, r is 1; $(R^8-O)_v$ is a polyoxyalkylene, which is a homopolymer, a random copolymer or a block copolymer of C_2-C_4 oxyalkylene units, wherein R^8 is C_2H_4 , C_3H_6 , C_4H_8 , or a mixture thereof, and v is an integer in the range of about 5 to about 250; R^9 is H or C_1-C_4 alkyl; and D is a C_8-C_{30} unsaturated alkyl, or a carboxy-substituted C_8-C_{30} unsaturated alkyl.

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9. A polymer that is the product of polymerization of a monomer mixture comprising, on a total monomer mixture weight basis:

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(a) about 10 to about 70 weight percent of at least one amino-substituted vinyl monomer or a salt thereof;

(b) about 20 to about 80 weight percent of at least one hydrophobic nonionic vinyl monomer;

(c) about 0.01 to about 25 weight percent of at least one associative vinyl monomer;

(d) about 0.01 to about 25 weight percent of at least one semihydrophobic vinyl surfactant monomer;

5 (e) up to about 10 weight percent of a hydroxy-substituted nonionic vinyl monomer;

(f) up to about 5 weight percent of a crosslinking monomer;

(g) up to about 10 weight percent of a chain transfer agent; and

(h) up to about 2 weight percent of a polymeric stabilizer.

10 10. The polymer of claim 9 wherein the amino-substituted vinyl monomer is selected from:

a mono-(C₁-C₄)alkylamino(C₁-C₈)alkyl (meth)acrylate,

a di-(C₁-C₄)alkylamino(C₁-C₈)alkyl (meth)acrylate,

a mono-(C₁-C₄)alkylamino(C₁-C₈)alkyl (meth)acrylamide,

15 a di-(C₁-C₄)alkylamino(C₁-C₈)alkyl (meth)acrylamide,

a nitrogen-containing heterocyclic (meth)acrylamide,

a nitrogen-containing heterocyclic (meth)acrylate, and a mixture

thereof.

20 11. The polymer of claim 9 wherein the hydrophobic nonionic vinyl monomer is a compound having either of the following formulas (I) or (II):

(I) CH₂=C(X)Z,

(II) CH₂=CH-OC(O)R;

wherein, in each of formulas (I) and (II), X is H or methyl; and Z is -C(O)OR¹,

-C(O)NH₂, -C(O)NHR¹, -C(O)N(R¹)₂, -C₆H₄R¹, -C₆H₄OR¹, -C₆H₄C1, -CN,

25 -NHC(O)CH₃, -NHC(O)H, N-(2-pyrrolidonyl), N-caprolactamyl,

-C(O)NHC(CH₃)₃, -C(O)NHCH₂CH₂-N-ethyleneurea, -SiR₃, -C(O)O(CH₂)_xSiR₃,

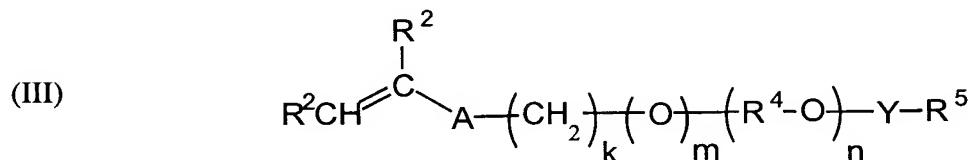
-C(O)NH(CH₂)_xSiR₃, or -(CH₂)_xSiR₃; x is an integer in the range of 1 to about 6;

each R is independently C₁-C₃₀ alkyl; each R¹ is independently C₁-C₃₀ alkyl,

hydroxy-substituted C₂-C₃₀ alkyl or halogen-substituted C₁-C₃₀ alkyl.

12. The polymer of claim 9 wherein the hydrophobic nonionic vinyl monomer is a C₁-C₃₀ alkyl ester of acrylic acid, a C₁-C₃₀ alkyl ester of methacrylic acid, or a mixture thereof.

5 13. The polymer of claim 9 wherein the associative vinyl monomer is a compound of the following formula (III):



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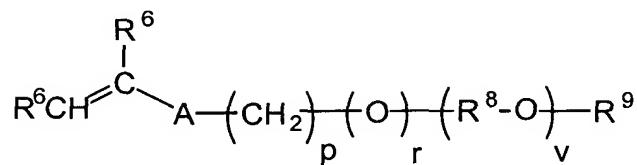
wherein,

each R² is independently H, methyl, -C(O)OH, or -C(O)OR³; R³ is C₁-C₃₀ alkyl; A is -CH₂C(O)O-, -C(O)O-, -O-, -CH₂O-, -NHC(O)NH-, -C(O)NH-, -Ar-(CE₂)_z-NHC(O)O-, -Ar-(CE₂)_z-NHC(O)NH-, or -CH₂CH₂NHC(O)-; Ar is a divalent aryl; E is H or methyl; z is 0 or 1; k is an integer in the range of 0 to about 30, and m is 0 or 1, with the proviso that when k is 0, m is 0, and when k is in the range of 1 to about 30, m is 1; (R⁴-O)_n is a polyoxyalkylene, which is a homopolymer, a random copolymer, or a block copolymer of C₂-C₄ oxyalkylene units, wherein R⁴ is C₂H₄, C₃H₆, C₄H₈, or a mixture thereof, and n is an integer in the range of about 5 to about 250; Y is -R⁴O-, -R⁴NH-, -C(O)-, -C(O)NH-, -R⁴NHC(O)NH-, or -C(O)NHC(O)-; and R⁵ is a substituted or unsubstituted alkyl selected from the group consisting of a C₈-C₄₀ linear alkyl, a C₈-C₄₀ branched alkyl, a C₈-C₄₀ carbocyclic alkyl, a C₂-C₄₀ alkyl-substituted phenyl, an aryl-substituted C₂-C₄₀ alkyl, and a C₈-C₈₀ complex ester; wherein the R⁵ alkyl group optionally comprises one or more substituents selected from the group consisting of a hydroxyl group, an alkoxy group, and a halogen group.

14. The polymer of claim 9 wherein the semihydrophobic vinyl surfactant monomer is a compound having either of the following formulas (IV) or (V):

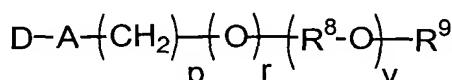
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(IV)



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(V)



wherein, in each of formulas (IV) and (V),

each R^6 is independently H, C_1-C_{30} alkyl, $-C(O)OH$, or $-C(O)OR^7$; R^7 is C_1-C_{30} alkyl; A is $-CH_2C(O)O-$, $-C(O)O-$, $-O-$, $-CH_2O-$, $-NHC(O)NH-$, $-C(O)NH-$, $-Ar-(CE_2)_z-NHC(O)O-$, $-Ar-(CE_2)_z-NHC(O)NH-$, or $-CH_2CH_2NHC(O)-$; Ar is a

15 divalent aryl; E is H or methyl; z is 0 or 1; p is an integer in the range of 0 to about 30, and r is 0 or 1, with the proviso that when p is 0, r is 0, and when p is in the range of 1 to about 30, r is 1; $(R^8-O)_v$ is a polyoxyalkylene, which is a homopolymer, a random copolymer, or a block copolymer of C_2-C_4 oxyalkylene units, wherein R^8 is C_2H_4 , C_3H_6 , C_4H_8 , or a mixture thereof, and v is an integer 20 in the range of about 5 to about 250; R^9 is H or C_1-C_4 alkyl; and D is a C_8-C_{30} unsaturated alkyl, or a carboxy-substituted C_8-C_{30} unsaturated alkyl.

15. The polymer of claim 9 wherein the amino-substituted

vinyl monomer is selected from:

3-(N,N-dimethylamino)propyl (meth)acrylate,

25 N'-(3-N,N-dimethylamino)propyl (meth)acrylamide,

2-(N,N-dimethylamino)ethyl methacrylate,

2-(N,N-diethylamino)ethyl methacrylate,

2-(tert-butylamino)ethyl methacrylate,

2-(N,N-dimethylamino)propyl methacrylamide, and

30 2-(N,N-dimethylamino)neopentyl acrylate.

(b) about 50 to about 65 weight percent of at least one hydrophobic nonionic vinyl monomer selected from a C₁-C₃₀ alkyl ester of acrylic acid, a C₁-C₃₀ alkyl ester of methacrylic acid, and a mixture thereof;

(c) about 0.1 to about 10 weight percent of at least one associative vinyl monomer selected from cetyl polyethoxylated methacrylate, cetearyl polyethoxylated methacrylate, stearyl polyethoxylated (meth)acrylate, arachidyl polyethoxylated (meth)acrylate, behenyl polyethoxylated methacrylate, lauryl polyethoxylated methacrylate, cerotyl polyethoxylated (meth)acrylate, montanyl polyethoxylated (meth)acrylate, melissyl polyethoxylated (meth)acrylate, lacceryl polyethoxylated (meth)acrylate, tristyryl phenolpolyethoxylated methacrylate, hydrogenated castor oil polyethoxylated methacrylate, canola polyethoxylated (meth)acrylate, and cholesterol polyethoxylated methacrylate;

(d) about 0.1 to about 10 weight percent of at least one semihydrophobic vinyl surfactant monomer having one of the following chemical formulas:

$$\text{CH}_2=\text{CH}-\text{O}(\text{CH}_2)_a\text{O}(\text{C}_3\text{H}_6\text{O})_b(\text{C}_2\text{H}_4\text{O})_c\text{H} \text{ or}$$
$$\text{CH}_2=\text{CHCH}_2\text{O}(\text{C}_3\text{H}_6\text{O})_d(\text{C}_2\text{H}_4\text{O})_e\text{H};$$

wherein a is 2, 3, or 4; b is an integer in the range of 1 to about 10; c is an integer in the range of about 5 to about 50; d is an integer in the range of 1 to about 10; and e is an integer in the range of about 5 to about 50;

(e) up to about 10 weight percent of a hydroxy-substituted nonionic vinyl monomer;

(f) up to about 5 weight percent of a crosslinking monomer;

(g) up to about 10 weight percent of a chain transfer agent; and

(h) up to about 2 weight percent of a polymeric stabilizer.

16. The polymer of claim 9 wherein the associative vinyl monomer is selected from cetyl polyethoxylated methacrylate, cetearyl polyethoxylated methacrylate, stearyl polyethoxylated (meth)acrylate, arachidyl polyethoxylated (meth)acrylate, behenyl polyethoxylated methacrylate, lauryl polyethoxylated methacrylate, cerotyl polyethoxylated (meth)acrylate, montanyl polyethoxylated (meth)acrylate, melissyl polyethoxylated (meth)acrylate, lacceryl

polyethoxylated (meth)acrylate, tristyryl phenolpolyethoxylated methacrylate, hydrogenated castor oil polyethoxylated methacrylate, canola polyethoxylated (meth)acrylate, and cholesterol polyethoxylated methacrylate, and a mixture thereof.

5 17. The polymer of claim 9 wherein the semihydrophobic vinyl surfactant monomer comprises a polymerizable, unsaturated end group and a polyoxyalkylene group covalently bonded thereto.

10 18. The polymer of claim 17 wherein the polyoxyalkylene group is a homopolymer, a random copolymer, or a block copolymer comprising about 5 to about 250 C₂-C₄ oxyalkylene units.

15 19. The polymer of claim 9 wherein the monomer mixture includes a semihydrophobic vinyl surfactant monomer having one of the following chemical formulas:



wherein a is 2, 3, or 4; b is an integer in the range of 1 to about 10; c is an integer in the range of about 5 to about 50; d is an integer in the range of 1 to about 10; and e is an integer in the range of about 5 to about 50.

20 20. The polymer of claim 9 wherein the monomer mixture comprises about 0.01 to about 10 weight percent of at least one hydroxy-substituted nonionic vinyl monomer, based on the total monomer mixture weight.

25 21. The polymer of claim 20 wherein the hydroxy-substituted nonionic vinyl monomer is selected from a hydroxy-substituted(C₁-C₄)alkyl acrylate, a hydroxy-substituted(C₁-C₄)alkyl methacrylate, hydroxy-substituted(C₁-C₄)alkyl acrylamide, a hydroxy-substituted(C₁-C₄)alkyl methacrylamide, and a mixture thereof.

22. The polymer of claim 20 wherein the hydroxy-substituted nonionic vinyl monomer is 2-hydroxyethyl methacrylate.

30 23. The polymer of claim 9 wherein the monomer mixture contains about 0.01 to about 3 weight percent of at least one crosslinking monomer, based on the total monomer mixture weight.

24. The polymer of claim 23 wherein the crosslinking monomer is an acrylate ester of a polyol having at least two acrylate ester groups, a methacrylate ester of a polyol having at least two methacrylate ester groups or a combination thereof.

5 25. The polymer of claim 9 wherein the monomer mixture contains at least about 0.1 weight percent of a chain transfer agent, based on the total monomer mixture weight.

10 26. The polymer of claim 25 wherein the chain transfer agent is selected from a thio compound, a disulfide compound, a phosphite, a hypophosphite, a haloalkyl compound, and a combination thereof.

27. A polymer that is the product of polymerization of a monomer mixture comprising, on a total monomer mixture weight basis:

(a) about 20 to about 50 weight percent of at least one amino-substituted vinyl monomer selected from:

15 3-(N,N-dimethylamino)propyl (meth)acrylate,
N'-(3-N,N-dimethylamino)propyl (meth)acrylamide.
2-(N,N-dimethylamino)ethyl methacrylate,
2-(N,N-diethylamino)ethyl methacrylate,
2-(tert-butylamino)ethyl methacrylate,
20 2-(N,N-dimethylamino)propyl methacrylamide, and
2-(N,N-dimethylamino)neopentyl acrylate.

25 (b) about 50 to about 65 weight percent of at least one hydrophobic nonionic vinyl monomer selected from a C₁-C₃₀ alkyl ester of acrylic acid, a C₁-C₃₀ alkyl ester of methacrylic acid, and a mixture thereof;

30 (c) about 0.1 to about 10 weight percent of at least one associative vinyl monomer selected from cetyl polyethoxylated methacrylate, cetearyl polyethoxylated methacrylate, stearyl polyethoxylated (meth)acrylate, arachidyl polyethoxylated (meth)acrylate, behenyl polyethoxylated methacrylate, lauryl polyethoxylated methacrylate, cerotyl polyethoxylated (meth)acrylate, montanyl polyethoxylated (meth)acrylate, melissyl polyethoxylated (meth)acrylate, lacceryl polyethoxylated (meth)acrylate, tristyryl phenolpolyethoxylated methacrylate, hydrogenated castor oil polyethoxylated

methacrylate, canola polyethoxylated (meth)acrylate, and cholesterol polyethoxylated methacrylate;

5 (d) about 0.1 to about 10 weight percent of at least one semihydrophobic vinyl surfactant monomer having one of the following chemical formulas:



10 wherein a is 2, 3, or 4; b is an integer in the range of 1 to about 10; c is an integer in the range of about 5 to about 50; d is an integer in the range of 1 to about 10; and e is an integer in the range of about 5 to about 50;

15 (e) up to about 10 weight percent of a hydroxy-substituted nonionic vinyl monomer;

(f) up to about 5 weight percent of a crosslinking monomer;

(g) up to about 10 weight percent of a chain transfer agent; and

15 (h) up to about 2 weight percent of a polymeric stabilizer.

28. The polymer of claim 27 wherein the monomer mixture comprises about 1 to about 5 weight percent of at least one hydroxy-substituted nonionic vinyl monomer, based on the total monomer mixture weight.

20 29. The polymer of claim 28 wherein the hydroxy-substituted nonionic vinyl monomer is selected from a hydroxy-substituted(C₁-C₄)alkyl acrylate, a hydroxy-substituted(C₁-C₄)alkyl methacrylate, hydroxy-substituted(C₁-C₄)alkyl acrylamide, and a hydroxy-substituted(C₁-C₄)alkyl methacrylamide, and a mixture thereof.

25 30. The polymer of claim 28 wherein the hydroxy-substituted nonionic vinyl monomer is 2-hydroxyethyl methacrylate.

31. The polymer of claim 27 wherein the monomer mixture comprises about 0.01 to about 3 weight percent of a crosslinking monomer, based on the total monomer mixture weight.

30 32. The polymer of claim 31 wherein the crosslinking monomer is an acrylate ester of a polyol having at least two acrylate ester

groups, a methacrylate ester of a polyol having at least two methacrylate ester groups or a mixture thereof.

33. The polymer of claim 27 wherein the monomer mixture comprises at least about 0.1 percent by weight of a chain transfer agent, based on the total monomer mixture weight.

34. The polymer of claim 33 wherein the chain transfer agent is selected from a thio compound, a disulfide compound, a phosphite, a hypophosphite, a haloalkyl compound, and a mixture thereof.

35. A process for the preparation of a polymer of claim 1 comprising emulsion polymerizing the monomer mixture in an aqueous medium, at a pH of not less than about 7, in the presence of a free radical initiator and a surfactant, and at a reaction temperature in the range of about 20 to about 80 °C.

36. The process of claim 35 wherein the emulsion polymerization is carried out in the presence of an emulsifying amount of at least one anionic surfactant, nonionic surfactant, amphoteric surfactant, or a mixture thereof.

37. A polymer emulsion produced by the emulsion polymerization process of claim 35.

38. A composition comprising a polymer of claim 1 and water.

39. The composition of claim 38 further comprising at least one of a pH adjusting agent, a buffering agent, an auxiliary fixative polymer, an auxiliary film former, an auxiliary rheology modifier, an auxiliary hair conditioning agent, an auxiliary skin conditioning agent, a chemical hair waving or straightening agent, a colorant, a surfactant, a polymer film modifying agent, a product stabilizing and finishing agent, a propellant, an auxiliary solvent, or a mixture thereof.

40. The composition of claim 38 further comprising at least one quaternary ammonium compound.

41. The composition of claim 38 further comprising at least one hydroxy carboxylic acid.

42. The composition of claim 38 further comprising at least one auxiliary fixative polymer.

5 43. A formulated composition comprising a polymer of claim 1 wherein the formulated composition is selected from the group consisting of a composition for personal care, health care, household care, institutional care, industrial care, and an industrial process.

44. The formulated composition of claim 43 wherein the composition for personal care is a cleanser for skin or hair.

10 45. The formulated composition of claim 43 wherein the composition for personal care or health care includes at least one of a pH adjusting agent, a buffering agent, an auxiliary hair-fixative, an auxiliary film former, an auxiliary rheology modifier, an auxiliary hair conditioning agent, an auxiliary skin conditioning agent, a chemical hair waving or straightening agent, a colorant, a surfactant, a polymer film modifying agent, a product stabilizing 15 and finishing agent, a propellant, an auxiliary solvent, or a mixture thereof.

46. The formulated composition of claim 43 wherein the composition for household care or institutional and industrial care is a cleanser.

20 47. The formulated composition of claim 43 wherein the composition for household care or institutional and industrial care includes at least one of a pH adjusting agent, a buffering agent, an auxiliary film former, an auxiliary rheology modifier, a colorant, a surfactant, a metal ion chelating agent, a dispersant, a propellant, an auxiliary solvent, or a mixture thereof.

48. The formulated composition of claim 43, wherein the composition for industrial processes is a textile treatment.

25 49. The formulated composition of claim 43, wherein the composition for household care, institutional and industrial care, or industrial processes is a paint or surface coating.

50. The composition of claim 43 in the form of a liquid, a gel, a foam, a spray, an emulsion, a semisolid, or a solid.

30 51. A composition comprising a polymer of claim 27 and water.

52. The composition of claim 51 further comprising at least one of a pH adjusting agent, a buffering agent, an auxiliary hair-fixative, an auxiliary film former, an auxiliary rheology modifier, an auxiliary hair conditioning agent, an auxiliary skin conditioning agent, a chemical hair waving or straightening agent, a colorant, a surfactant, a polymer film modifying agent, a product stabilizing and finishing agent, a propellant, an auxiliary solvent, or a mixture thereof.

5 53. The composition of claim 51 further comprising at least one quaternary ammonium compound.

10 54. The composition of claim 51 further comprising at least one hydroxy carboxylic acid.

55. The composition of claim 51 further comprising at least one auxiliary fixative polymer.

15 56. A formulated composition comprising a polymer of claim 27 wherein the formulated composition is selected from a composition for personal care, health care, household care, institutional care, industrial care, or an industrial process.

57. The formulated composition of claim 56 wherein the composition for personal care is a cleanser for skin or hair.

20 58. The formulated composition of claim 56 wherein the composition for personal care or health care includes at least one of a pH adjusting agent, a buffering agent, an auxiliary hair-fixative, an auxiliary film former, an auxiliary rheology modifier, an auxiliary hair conditioning agent, an auxiliary skin conditioning agent, a chemical hair waving or straightening agent, a colorant, a surfactant, a polymer film modifying agent, a product stabilizing and finishing agent, a propellant, an auxiliary solvent, or a mixture thereof.

25 59. The formulated composition of claim 56 wherein the composition for household care or institutional and industrial care is a cleanser.

30 60. The formulated composition of claim 56 wherein the composition for household care or institutional and industrial care includes at least one of a pH adjusting agent, a buffering agent, an auxiliary film former, an

auxiliary rheology modifier, a colorant, a surfactant, a metal ion chelating agent, a dispersant, a propellant, an auxiliary solvent, or a mixture thereof.

61. The formulated composition of claim 56, wherein the composition for industrial processes is a textile treatment.

5 62. The formulated composition of claim 56, wherein the composition for household care, institutional and industrial care, or industrial processes is a paint or surface coating.

63. The composition of claim 56 in the form of a liquid, a gel, a foam, a spray, an emulsion, a semisolid, or a solid.

10 64. An aqueous polymer emulsion comprising a polymer of claim 1 and at least one surfactant.

65. The aqueous polymer emulsion of claim 64 wherein the surfactant comprises about 1 to about 10 percent by weight of the emulsion on a total emulsion weight basis.

15 66. The aqueous polymer emulsion of claim 64 wherein the polymer comprises at least about 15 percent by weight of the emulsion on a total emulsion weight basis.

20 67. The aqueous polymer emulsion of claim 64 wherein the surfactant comprises at least one nonionic surfactant, anionic surfactant, or a mixture thereof.

68. A hair care composition comprising an effective amount of a polymer of claim 1 to provide the hair care composition with a property selected from a hair fixative property, a hair conditioning property, a viscid property, and a combination thereof.

25 69. The hair care composition of claim 68 further including at least one auxiliary film-forming, hair-fixative, an auxiliary hair conditioning agent, auxiliary rheology modifying agent, or a mixture thereof.

30 70. A skin care composition comprising an effective amount of a polymer of claim 1 to provide the skin care composition with a property selected from a skin conditioning property, a viscid property, and a combination thereof.

71. The skin care composition of claim 70 which includes at least one auxiliary skin conditioning agent, auxiliary rheology modifying agent or a mixture thereof.